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ABSTRACT

Many external factors will influence classrooms as the year 2000 approaches. This paper looks at a vision of what schools may look like in the year 2000, with classrooms where information will be accessed, processed, displayed, demonstrated, and communicated through multimedia. There will be two different types of classroom: the master classroom, a teacher-centered facility which serves as a bridge between the analog and digital world; and the computer classroom/instructional lab, a learning-centered classroom equipped with computers and the latest software and multimedia technology. The paper addresses the advantages and disadvantages of instructional labs, and teacher computer proficiency. It offers a strategic plan for an instructional lab, where new technology complements the instructional models of teachers; explores problems related to the design, costs, and procedures of an instructional lab; and enumerates specific recommendations for lab implementation. (Author/SWC)

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INSTRUCTIONAL LABS: PLUSES AND MINUSES

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Abstract

As we approach the year 2000, we know that many external factors will influence our classrooms. Several questions are of concern for every teacher or educator: Do we have a vision of what classrooms may look like in year 2000? Are our computer labs becoming instructional labs? Are teachers ready to teach in instructional labs? Are our labs well equipped with instructional technology? Is design of computer lab important? This paper tries to explore answer for these questions and presents a strategic plan for an instructional lab, where new technology complements the instructional models of teachers.

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Introduction:

As we approach the year 2000, we know that many external factors will influence our classrooms. Several questions are of concern for every teacher or educator: Do we have a vision of what classrooms may look like in year 2000? Are our computer labs becoming instructional labs? Are teachers ready to teach in instructional labs? How much computer knowledge is enough? Are our labs well equipped with instructional technology? Is there a difference between future classroom and instructional labs? Can all computer labs be converted in instructional lab? How to allocate computer resources within our schools? How does computer labs meet the instructional styles of the teachers? Is design of computer lab important?

This paper tries to explore answer for these questions and presents a strategic plan for an instructional lab, where new technology complements the instructional models of teachers. The paper also identifies the problems relating to design, costs and procedures of the lab.

Do we have a vision of what schools may look like in Year 2000?

Imagine a classroom with full of computers, where students are looking at the monitor screen. They see worlds within worlds, resizeble windows into reality, layers of knowledge, images, symbols, animations and 3D mathematical models. Perhaps, these worlds, layers, and windows-will be displayed on a tile-like mosaic of flat screen monitor "pasted" on the wall or on screen. They are thinking the ways to get through this wall or screen. Imagine another classroom in which students in groups take charge of the classroom, by becoming multimedia authors, creating quicktime movies, desktop publisher, creating slide presentation of Science and math. Both classrooms are the example of future classroom, where information will be accessed, processed, displayed, demonstrated and communicated through multimedia.

What does it say to us "The future is not what it used to be!"stated a well-known educator several years ago. It certainly isn't. Changes are occurring at an unprecedented rate. We have entered the information age, post-industrial society, the communication era. We are bombard daily by changing values, life styles, relationships, products and emerging technologies. Yesterday science fiction is rapidly becoming reality. Electric cars, notebook-size computers and smart appliances are no longer dreams. World wide interactive communication links that simultaneously transmit audio, video, and hard copy are already in place. And world's knowledge base is growing at exponential rate.

Today's information society requires people with different skills, must be able to communicate , problem-solve, use a variety of strategies to access and analyze information and be able to work in a group situation. They must also be able to use the tools relevant to the Information Society and not simply view these tools as objects of study. Old paradigms are disappearing and new paradigms are emerging.

New Emerging Paradigms

New paradigm are emerging in education, technology , classroom environment and culture of the classroom. In education, visual literacy is replacing textual literacy. Learner-based teaching is going to be the norm. In technology, digital video is going to be used as multimedia. Two-way interactive learning is getting popular and becoming common. Classroom environment is changing towards interactive teaching and learning. Culture of the classroom is changing to be multicultural. Diversity in classroom is creating new challenges for the teachers. What does this mean for teachers and educators? This means to shift the teaching and learning from the relevant to an industrial age to the information age of today. We must integrate these information tools into everyday classroom activities so that our students will view and use them as productivity instruments.
Two models of classrooms have emerged as a result of information age: (1) Master Classroom and (2) Computer Classrooms.

Master Classroom

Master classroom is defined as the classroom which provides full range of technological support, media, computer and network. In other words master classroom provides a bridge between analog and digital world. Master classroom is a teacher-centered facility, which is supported by Integrated control system.

Computers Classroom/Instructional Labs

Computers Classroom, (from now on I will refer instructional lab) is defined

as a facility, where modes of instruction are learner-centered teaching, individualized learning, collaborative activities, interactive learning, presentations and demonstration. To really work, these technology-enriched instructional labs of the 1990s must empower the student and teacher to learn and to explore in many directions. Learning-centered classroom, where teacher is free to use whatever material and methods is most appropriate. Regular classrooms are becoming the basic setting for the use of digital technologies. Now, with more and more computers in the regular classroom, teachers, groups of students, and individual learners can use the computer when needed-even if is just a few minutes. In other words, classes are held in computer labs, which in turn are becoming instructional labs.

Instructional labs consists of varied number of students stations, and one instructor station. Every work station is equipped with multimedia technology. Every lab is equipped with video card, color scanner, laser printer, image writer, projection screen and LCD panel. These labs are equipped with most current software. If teaching in a computer labs is same as teaching in instructional labs, any lab can be converted to instructional lab. But open labs are different from instructional labs in their requirement, utilization and diverse group of learners. There are some pluses and minuses of using these Instructional Labs. Pluses can be determined by the utilization of these labs to the fullest, and minuses will be determined by the user's needs and operation criteria.

Instructional Lab: Pluses

Students like to be taught in these classrooms/labs. There are three basic advantages of using these instructional labs from the point of view of learner, which can be best described in the following children' rhyme[1],

"No More Lectures
No More Books
No More teacher's Dirty looks."

No More Lectures: There will be less lecture, more participation. Teacher is acting as mentor. Most of the assignments are on contract basis, student learn at their own pace. Teacher is there to coach them, or act as a facilitators. More classroom activities, more hands on experience. Collaborative learning is quite common in these classes.

No More Books: Books are there but are replacing with electronic books i.e. bookware. High usage of desktop publishing. Interactive text, global experience through network.

No more Teacher's Dirty looks: Climate will be improved, diverse projects based on gender/race/cultural issues. Diversity learning through global access.

From the point of view of an instructor, the method of instruction consist of mini lectures, team teaching, group ware continuous evaluation, electronic collaboration, global information access, bookware, and improved classroom climate with diverse teaching and learning styles. Teaching in these labs will provide a unique experience for teachers, where teachers and students learn and explore together the real world of knowledge.

Instructional Lab: Minuses

Most common problems in these instructional labs are related to hardware problem, software problems and management problems.

Hardware Problem: Most common problem is lack of memory on hard drive, work can not be saved, sound can't be played, scanned pictures can not be displayed etc. etc.

Software Problems: Software is getting obsolete, upgrading of software is cost limited , and new virus protection needed. etc. etc.

Lab management Problem: Lab monitor , security, and operational problem.

Pluses and minuses of instructional lab depends on the full utilization of these computer classrooms/instructional labs. Suppose we have two Computer classrooms/instructional lab with 12 student stations and one instructor station, equipped with multimedia technology in a school setting. Are these labs utilized to the full potential. Are our teachers ready to teach in these labs? How much computer knowledge is enough to teach in these labs?. Do these labs meet the instructional styles of teachers. Is Design of the lab important? Arranging computers in a lab setting makes sense only if the teaching styles of the teachers in school make it easy for them to take advantage of the lab. The question arises how well do these model match the instructional styles of teachers who are supposed to be benefiting from them. A good instructional lab is the one where new technologies complement the instructional model of teachers. To run successfully these technology-enriched classrooms, computer proficiency of teachers and design of the instructional lab are the two most important variables.

1.Teacher's Computer Proficiency:

How much teachers should know about computers to teach in instructional labs. Should they be computer programmer, or computer literate. According to International Society for Technology[2] in Education's curriculum guidelines following skills are important to teach in computerized classrooms:

•Teachers must demonstrate ability to operate a computer system in order to successfully utilize software; the use of computer-based system should become the second nature for teachers.
•Must be able to evaluate and use computers and other related technologies to support the instructional process.
•Use computer-based technologies to access information to enhance personal and professional productivity.
•Apply computers and related technologies to facilitate emerging roles of learners and the educator.
• Demonstrate knowledge of uses of multimedia, hypermedia, and telecommunication to support instruction.

2. Design of the Instructional lab

Design of a good instructional lab does not consist only outlay of the room or hardware and software, and cost of lab, but also addresses the "soft issues", like, teachers' needs, learner needs, ergonomics, health of the users, management of lab, and operation of lab.

a. Layout

The layout of the lab will vary depending on the size and configuration of the room. Any layout should be carefully thought through to make most of the conditions.

b. Instructional Needs vs Lab Requirements

Lab requirements are that microcomputers are easy to use, information display will be effective, and teacher's control system will be effectively devised.

c. Computer Issues

Reliability of the lab in terms of equipment is important. Lab should be reliable in meeting the needs of instructor and learner. Proper hardware and software are to be installed.

d. Hardware and Software Selection

Always select the hardware you can support. If limited budget is the factor then use the simple software. Buying computers is not difficult, maintenance and repair costs more. If you decide to use multimedia in your labs, think twice. Always select integrated or preconfigured multimedia system. Always select what you can support. Software selection will meet the instructor needs and learner needs. Training should be provided to the teachers. Reliable virus protection software to be selected.

Selecting hardware and software for instructional labs should be carefully planned. In selecting hardware, it is always good to take advise from computer specialist. How many computers are ideal for class. Decision to buy

the computers should be taken after the needs analysis of teachers, and other users. Usually the decision is taken by vendor or administrators, who hardly use that classroom. There should always a support person to help the lab monitor in case of hardware problems. Selection of software will be determined by the needs of teachers and students.

e. Media

Labs will need to be equipped with Multimedia computers, projection screen, LCD (Liquid Crystal Display), video/data projector, LCD projection panel, or overhead projector.Video/data projector may be permanently suspended from the ceiling. No visible hanging wires from the computers should be allowed in lab.

f. Management of Instructional Lab

A good design will incorporate a " Management plan" for the lab, which includes constant monitoring of lab, lab procedure, labs scheduling. Lab will be monitored before the classes and after the classes. Before classes it is important to see that all computers are working, after classes to trash the unnecessary files. To save time loading of software can be done through file share from one computer to other computers. Procedures and labs schedules of the labs can be put on computers, so that students can access from any place on the campus. Procedures can be posted on doors or walls. No drinks and food to be allowed in the instructional labs.

f. Security of hardware and software

When planning and selecting hardware, security measures for the lab must be carefully evaluated, purchased, and installed. Windows, doors, false ceilings, and HVAC ducts should be fitted with electronic alarms. Lab monitors and consultants should also be responsible for attending to security.

For software security, the lab should be equipped with virus detection and disinfectant applications and consultant make sure that all users submit their disks for examination. Lab hard disk should be checked regularly for virus, illegal copies of applications, excessively large and costly files.

g. Cost of the instructional lab

Cost is the limiting factor in developing an ideal instructional lab. With new technologies and advancement of software, software and hardware become obsolete. To upgrade the technology in these labs take long time, because of shortage of funds.

h. Computer and Health:

One of the most neglected issue in designing an instructional lab is safety , health of the user. Information about the threat that computers present to health is important for all those involved in education-administrators, teachers, and students. Obviously, administrators and teachers need to know because they control how the technology is set up and used. But students should also be taught correct use of technology because they will be using it throughout their working lives. These issues are being discussed more and more in the media as we become aware of cumulative effects of long term exposure to, or use of, the machinery. Health issues are especially significant. Computer and related electronic system can cause debilitating, Extremely low Frequency(ELF) Emissions, Carpel Tunnel Syndrome (CTS) and some time life -threatening illness when used incorrectly. In designing a lab these health issues are significant.

In order to avoid ELF emissions and safety the following recommendation should be implemented in any school, home, or office computing environment:

- Position computer monitors so that user can sit at least an adult arm's length (two to three feet) from the screen.
- Maintain similarly adequate distance from the sides and back of the other adjacent computing machines.
- The standard recommended depth for computer tables is 30 inches (Apple Computer[3]).

i. Ergonomics

A good design always takes into consideration Ergonomics. Ergonomics (Human factors engineering) is "an applied science that coordinates the design of devices, systems, and physical working conditions with the capacities and requirements of the worker." (Webster's, 1991). Ideal situation is for one to avoid the injury in the first place, and this is possible with the application of elementary ergonomics adjustments to furniture and to one's work routines. Examples are: take a break, support the wrist, share jobs, keep work habits flexible and varied and create the right ambience: from lighting to noise, colors, wall coverings, and space.

Lighting should be subdued and localized so as to cut down on eyestrain and headache-inducing glare from the computer screen. The computer screen should be tilted if necessary in order to reduce glare. Noise should be muted by sound-absorbing floor, wall, and ceiling materials. Colors of walls and ceilings should be neutral(light pastel shades). All surfaces should be nonreflective.

The more space for movement around a classroom the better. This reduces stress, both physically and psychologically. People also work better when they have room to breath. Usually, very little consideration is given to how to optimize the space in a room so that open space is maximized. It is surprising how much space can be gained through careful placement of furniture. The simplest technique is to use scaled-down, cut-out shapes of all the furniture that will go into the room. Then, on a similarly scaled down floor plan, try any number of options until the maximum amount of open space is made available . Applying this idea will help avoid stereotypical layouts. A nice team-building idea is to make a competition out of designing the best layouts for the classrooms or computer labs. An ideal design can use the following recommendations, some which are adapted from Pool.[5]

Recommendations :

• Provide chairs that can be adjusted for heights so that user can position the computer monitor at, or slightly below, eye level. This encourages user to hold the head in a comfortable upright position, thus taking pressure off the neck and upper back.
• The chairs should also have adjustable back rests to support the lower and middle back.
• If possible, set the controls of computer screens so that the background color is white. This reduces eye strain.
• Tilt the screen (with wedges if necessary) to cut glare from light sources, natural or otherwise.
• Computer keyboards should be detachable so that the user can sit back from the monitor and as adjust the orientation of the keyboard for maximum comfort.
• Keyboard should also be adjustable for height to fit the position of the wrist, which will vary from person to person.
• Use tables that are deep enough to allow the user to be at least an adult arm's length from the computer monitor. This reduces the risk of side effects from EFL emissions.
• The table should be large enough to provide adequate work space for writing and other activities.
• Use nonreflective and sound proofed materials for all surfaces in the room to cut down and other activities.
• Use neutral colors for surfaces and equipment to create a restful ambience for the eyes.
•Use ergonomics when setting up standard computer equipment (footprint of the computer system, keyboard)
• Select or adapt furniture to fit the user

Summary

Today's utilization of instructional labs depends on team work among teachers, learners, technology experts and administration. Appropriate training of teachers, and well designed multimedia instructional lab environment will prepare the teachers for future computer classrooms. Design of lab is important, but the most important is the user of the facility, their needs, their learning and teaching styles. But the key is "The Vision" created and shared by teachers, administrators, and technical support group for a future learning.

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